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REMARKS

This Amendment and Response is submitted in reply to the Office Action mailed July 1, 2004. Claims 55-63 and 65 were withdrawn from consideration. Claims 39-49 deemed allowable. Claims 1-65 have been canceled and new claims 66-110 have been added. Reexamination and reconsideration is respectfully requested.

Claims 21-29 were rejected for various informalities. Claims 21-29 have been canceled rendering the rejection moot.

The claims are directed to a method of making a pultruded part that is very thin and possesses high lateral strength as a result of a reinforcing structure that is able to withstand the forces encountered during the pultrusion process.

Claim 66 corresponds generally to allowed claim 39. Applicants respectfully submit that claims 66-84 are in condition for allowance.

New independent claim 85 recites 1) arranging a plurality of first reinforcing fibers in a direction generally transverse to the longitudinal pull direction in a generally planar, non-overlapping configuration so that the first reinforcing fibers do not extend over or cover one another and 2) arranging a plurality of second reinforcing fibers in a direction different than the direction of the first reinforcing fibers and in a generally planar, non-overlapping configuration so that the second reinforcing fibers do not extend over or cover one another. Additional layers having the same non-overlapping configuration can also be added.

New independent claim 101 recites 1) arranging a plurality of first reinforcing fibers in a direction generally transverse to a longitudinal axis of a pultrusion die in a generally planar, non-overlapping configuration so that the first reinforcing fibers do not extend over or cover one another, and 2) arranging a plurality of second reinforcing fibers along the longitudinal axis and in a generally planar, non-overlapping configuration so that the second reinforcing fibers do not extend over or cover one another. Support for these limitations is found in the specification on page 18, lines 15-24.

Claims 85 and 101 also recite a reinforcing structure that provides longitudinal strength, shear strength and anti-skew properties sufficient to substantially maintain the

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relative orientations of the first and second reinforcing fibers when subjected to the pulling forces encountered during pultrusion.

The resulting pultruded part is very thin. The following quote from the specification summarizes the benefits of the present pultruded parts made using the claimed reinforcing mat:

"The present reinforcing mats 18 or 18A permit the manufacture of pultruded parts with wall thicknesses of about 0.10 inches, and preferably about 0.06 inches and more preferably about 0.03 inches or less.

The resin matrix 20 comprises about 20-40% of the cost of the pultruded part 10. Minimizing wall thickness minimizes resin cost. The thin reinforcing mat 18 with high transverse strength of the present invention permits a reduction in wall thickness without compromising transverse strength. (Specification, page 13, lines 12-19).

The reinforcing mat recited in the present invention typically has a compressed thickness of about 0.004 inches to about 0.020 inches. Since the reinforcing mat can be made relatively thin with a low areal density and reinforcing fibers oriented in the transverse direction, the present reinforcing mat can be used to make very thin pultruded parts. (Specification, page 13, lines 12-25).

"The present reinforcing mat permits about a 33% reduction in wall thickness with the same or greater transverse strength than pultruded parts reinforced with conventional continuous filament mats. Wall thickness of about 0.039 inches using the present reinforcing mats have demonstrated a transverse tensile strengths of about 20,000 psi." (Specification, page 14, lines 4-8).

Applicants respectfully submit that the benefits discussed above are not provided by any of the cited references, either alone or in combination.

Claims 1-15, 18-31, 34-36, 52-53 and 64 were rejected under 35 U.S.C. §102(b) as being anticipated by, or in the alternative, obvious under 35 U.S.C. § 103(a) over U.S. Patent No. 4,752,513 (Rau et al.). All of these claims have been canceled rendering the rejection moot.

Figure 5 of Rau (4,752,513) illustrates a plurality of overlapping continuous strand layers (reinforcing fibers 4-7) that crisscross the mat 62. The overlapping reinforcing fibers 4-7 of Rau stack up and increase the thickness of the reinforcing mats so that each

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layer of Rau has a thickness of more than one reinforcing fiber diameter. The overlapping reinforcing fibers 4-7 of Rau increase the thickness of the resulting reinforcing mats 77 and 78 and the wall thickness of pultruded parts made using the mat of Rau, increasing resin usage, weight and cost of the pultruded part. Rau does not teach or disclose two (or more) layers of reinforcing fibers arranged with each layer having a generally planar, non-overlapping configuration so that the reinforcing fibers in a given layer do not extend over or cover one another.

Applicants submit that Rau is also silent as to a method of preparing a reinforcing structure that provides longitudinal strength, shear strength and anti-skew properties sufficient to substantially maintain the relative orientations of the first and second reinforcing fibers when subjected to the pulling forces encountered during pultrusion. Applicants submit that claims 66-110 distinguish over Rau and are in condition for allowance.

Claims 16-17 and 38 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rau and further in view of U.S. Patent No. 3,761,345 (Smith). The rejected claims have been canceled rendering the rejection moot. It is suggested on page 6 of the Office Action that it would have been obvious to replace the reinforcing structure taught by Rau with the reinforcing structure taught by Smith.

As illustrated in Figure 4 of Smith (3,761,345), the first layer 20 overlaps itself at least once so that it has a thickness of at least two reinforcing fiber diameters. Similarly, as illustrated in Figure 5 of Smith, the third layer 60 overlaps itself at least once. When combined with the first layer 50, the reinforcing material of Smith is at least five reinforcing fiber diameters thick, even before the addition of the stitching or any other layers disclosed in Smith.

Smith does not teach or disclose two (or more) layers of reinforcing fibers arranged with each layer having a generally planar, non-overlapping configuration so that the reinforcing fibers in a given layer do not extend over or cover one another. Smith is also silent as to a method of preparing a reinforcing structure that provides longitudinal strength, shear strength and anti-skew properties sufficient to substantially maintain the relative

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orientations of the first and second reinforcing fibers when subjected to the pulling forces encountered during pultrusion. Consequently, Applications submit that claims 66-110 distinguish over the cited references and are in condition for allowance.

Claim 32-33 and 37 were rejected under 35 U.S.C. §103 as being unpatentable over Rau, and further in view of U.S. Patent No. 5,908,689 (Dana et al.). Claims 32-33 and 37 have been canceled rendering the rejection moot. Dana (5,908,689) discloses a reinforced polymeric composite having a primary layer formed from a plurality of randomly oriented essentially continuous glass fiber strands. (Dana, column 3, lines 24-26). The secondary layer comprises a plurality of fiber strands of discontinuous lengths. (Dana, column 11, lines 43-44). As best illustrated in Figures 2 and 2a of Dana, the loops of continuous glass fiber strands overlap so that the resulting reinforcing structure may be as much as twelve reinforcing fiber diameters thick in some locations.

Dana does not teach or disclose two (or more) layers of reinforcing fibers arranged with each layer having a generally planar, non-overlapping configuration so that the reinforcing fibers in a given layer do not extend over or cover one another. Dana is also silent as to a method of preparing a reinforcing structure that provides longitudinal strength, shear strength and anti-skew properties sufficient to substantially maintain the relative orientations of the first and second reinforcing fibers when subjected to the pulling forces encountered during pultrusion. Consequently, Applications submit that claims 66-110 distinguish over the cited references and are in condition for allowance.

Claims 50-51 and 54 were rejected under 35 U.S.C. §103 as being unpatentable over Rau, and further in view of U.S. Patent No. 5,910,458 (Beer et al.). Claims 50-51 and 54 have been canceled rendering the rejection moot.

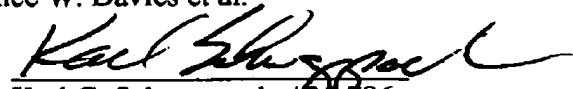
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No fee is believed to be necessary. Should any fee be required, however, the Commissioner is authorized to charge our deposit account no. 06-0029 and is requested to notify us of the same.

Respectfully Submitted,

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